HEAD INJURY / TBI
UPDATED 3/2025

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
- ❑ Cardiac monitor, CO2, and Pulse Oximetry monitoring
- ❑ **Treatment Plan**
  - Maintain airway. Administer oxygen to maintain SaO2 90-94%.
  - Consider spinal motion restrictions per the ***Spinal Motion Restriction Guideline***
  - Elevate head 30 degrees.
  - Monitor the level of consciousness during the transport
  - **Severe TBI** (GCS <8 or AVPU "P" or "U"):
    - Adult: Consider endotracheal intubation only if BVM or Supraglottic airway fails, or emesis occurs.
    - Pediatrics: Continue effective BVM. Utilize airway adjuncts, if needed to ensure adequate chest rise, ventilation, and oxygenation.
    - **Do not hyperventilate** unless the patient shows signs of herniation:
      - Unilateral pupillary dilation or posturing.
        - In this case, increase respiratory rate by ~10% above normal target respiratory rate.
        - Target ETCO2: 30-35 mmHg.

Mild Hyperventilation Guide for Signs of Herniation

Age	Normal Ventilation Rate	Mild Hyperventilation Rate
Neonate	40	44
Infant	30	33
Child	20	22
Adult	10	12

  - Open skull fractures should be covered with dry sterile dressings. Do not apply pressure unless needed to stop severe hemorrhage.
    - Do Not use NPA with patients that have open facial or skull fractures.
- ❑ **Key Considerations**
  - TBI may be painful. However, excessive pain medications can cloud serial neurological assessments. Pain medications should generally be avoided in a patient with altered mental status after TBI. If pain is severe, give small doses only until pain is manageable.
  - Patients with TBI may be confused or combative. Consider physical/chemical restraints if needed to protect patient or personnel.
  - Loss of memory, prolonged confusion or altered mental status associated with trauma may indicate a significant head injury.
  - Avoid hypoxia (SpO2 should be 90-94%).
  - Avoid over tightening of cervical collar (if placed) as this can cause increased intracranial pressure
  - Do not allow the patient to be hypotensive. Try to keep adult SBP >110 or MAP of 90 using the ***Shock, and Fluid Therapy Guideline.***
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

PEDIATRIC
Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access, and fluid therapy
- ❑ Check blood pressure every 5-10 minutes.
- ❑ Initiate NS or LR 500-1000cc for hypotension or unable to obtain blood pressure. May repeat to keep SBP >110mmHg or MAP of 90 for TBI.

PARAMEDIC

- ❑ **Hypotension unresponsive to fluids:**
  - **Epinephrine drip 2–10 mcg/min** IV/IO infusion for persistent hypoperfusion. Titrate to maintain a SBP of 110 mmHg or MAP of 90.
  - **Push Dose Epinephrine (1:10,000) 2-10mcg** as needed to maintain a SBP of 110 mmHg or MAP of 90.
  - **Norepinephrine initial dose: 0.01-3 mcg/kg/min** IV/IO. Titrate to maintain a SBP of 110 mmHg or MAP of 90.

AEMT

- ❑ Advanced airway, vascular access, and fluid therapy
- ❑ Check blood pressure every 5-10 minutes.
- ❑ Initiate NS or LR 20ml/kg IV/IO for hypotension OR if unable to obtain blood pressure. May repeat NS or LR 20 ml/kg IV/IO up to a total of 60 ml/kg

PARAMEDIC

- ❑ **Hypotension unresponsive to fluids:**
  - **Epinephrine 0.1–1 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg
  - **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP >70 + (age in years x 2) mmHg after fluid bolus
  - **Norepinephrine** initial dose: **0.05 - 1 mcg/kg/min**, IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x2) mmHg.